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Surveillance for Severe and Fatal Infections Associated With Influenza

Over the past several years there have been publications and reports addressing an emerging phenomenon in this country, severe or fatal co-infections with *Staphylococcus aureus* and influenza. Many states including Washington have received anecdotal reports of such infections in recent years. Department of Health is requesting assistance from local health jurisdictions and health care providers in our state for increased surveillance of these co-infections during this influenza season.

Pediatric Influenza-Associated Deaths and Fatal Co-Infections

The Centers for Disease Control and Prevention (CDC) recently published an article in Pediatrics summarizing national surveillance data for pediatric influenza-associated mortality. This article reported an increase over recent years in the number of fatal pediatric influenza deaths, with a specific increase in influenza and *Staphylococcus aureus (S. aureus)* co-infections.

From October 1, 2004 through September 30, 2007, 39 states and two local health departments reported a total of 166 influenza-associated pediatric deaths in the United States. Isolation of *S. aureus* from these pediatric deaths increased from one case during the 2004–2005 season and three cases in 2005–2006 to 22 cases in 2006–2007. There was one methicillin-resistant *S. aureus* (MRSA) isolate from these cases in 2004–2005 and 13 MRSA isolates in 2007–2008. The cases with influenza and *S. aureus* co-infection during 2006–2007 had a median age of ten years.

Influenza immuniation
Image courtesy of CDC

The fivefold increase over three seasons in pediatric deaths associated with influenza and *S. aureus* co-infection emphasizes the importance of preventing such severe infections. An observation from the article was that the influenza-associated deaths occurred rapidly, with almost half the cases dying within 72 hours of symptom onset and a similar proportion dying at home or in the emergency department. There is consequently limited time to initiate antibiotics to treat the *S. aureus* infection. Avoiding influenza infection through vaccination is a key prevention measure.

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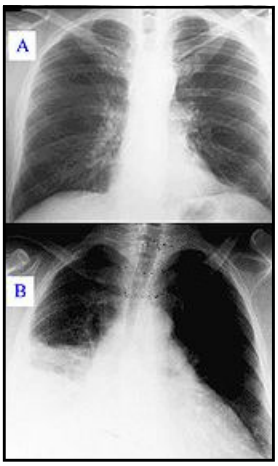
In the article discussing pediatric influenza deaths, it was noted that few of the children with indications for influenza vaccination had received vaccine that season. However, the majority of cases were previously healthy children for whom vaccination was not yet recommended. As of 2008 almost all children are included among those recommended for annual influenza vaccination.

Reference: Finelli L, Fiore A., Brammer L, et al. Influenza-Associated Pediatric Mortality in the United States: Increase of *Staphylococcal aureus* Co-infection. Pediatrics 2008;122(4):805–11.

Surveillance for Severe Influenza Infections in Washington

During the 2008–2009 respiratory season, routine influenza surveillance activities in Washington will include sentinel health care provider surveillance for influenza-like illnesses and laboratory surveillance for influenza isolates. The Washington State Department of Health Communicable Disease Epidemiology Section (CDES) is requesting two additional types of surveillance on a voluntary basis. One type is reporting influenza-associated pediatric deaths. The second is surveillance for severe pneumonias due to influenza and *S. aureus* co-infection in previously healthy individuals less than 50 years old.



A. Normal lung X-ray B. Abnormal lung X-ray showing pneumonia in right lung (left side of image) Image courtesy of Wikimedia

National reporting of influenza-associated pediatric deaths was implemented in 2004; this condition is currently reported voluntarily in Washington but may be added to the notifiable conditions reporting requirements in the future. National data for influenza-associated pediatric deaths are reported by influenza season, which begins around October 1st of each year. For surveillance purposes, a case is defined as: a death in a child less than 18 years old with an influenza-like illness and laboratory confirmed influenza infection testing by a standard method. Influenza testing may occur before or after death.

Consistent with national notifiable conditions, CDES is requesting voluntary reporting of influenza-associated pediatric influenza deaths. Appropriate reporters for the local health jurisdiction to notify would include health care providers, emergency departments, intensive care units, and medical examiners. Following a local investigation, reported cases will be reviewed by CDES and CDC. Cases are defined as:

- age under 18 years
- death from clinically compatible influenza-like illness
- laboratory confirmation of influenza (includes rapid diagnostic test)

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Respiratory specimens, respiratory tract tissue, and paired sera can be tested for influenza. Bacterial co-infection, specifically with *S. aureus*, is of particular interest for these fatal pediatric cases. *S. aureus* isolates should be tested for antibiotic susceptibility. Washington State Public Health Laboratories can assist with bacterial cultures or testing for influenza on both pre-mortem and post-mortem specimens. Consult a CDES epidemiologist for assistance.

CDES is also requesting reports of severe pneumonias due to confirmed *S. aureus* and influenza co-infection. Nationally there has been an increase in reports of co-infections with these organisms over the past several years, including severe or fatal cases in older children and young adults. Health care providers and health care facilities are asked to report to their local health jurisdictions cases defined as:

- age under 50 years
- previously healthy
- critical illness (e.g., ICU admission or death)
- confirmed *S. aureus* pneumonia and confirmed influenza infection

Co-infection will be detected only if both bacterial and influenza testing are done. Younger persons critically ill with pneumonia, particularly those who were previously healthy, should be tested for both types of infections. Washington State Public Health Laboratories is available as a resource to assist with testing. Health care providers should be aware of the local prevalence of methicillin-resistant *S. aureus* (MRSA) when choosing empiric therapy for patients with suspected influenza-related pneumonia, and should request susceptibility testing for *S. aureus* isolates from severe respiratory infections. CDES requests laboratory submission of *S. aureus* isolates from severe cases.

Agar plate with MRSA showing decreased growth inhibition to multiple antibiotics
Image courtesy of Andrew Walker
Health Protection Agency, UK

Recommendations for Influenza Vaccination

As a reminder, vaccinating both patients and health care providers for influenza may reduce serious respiratory illnesses in the community. Recommendations for influenza vaccination were recently expanded. In addition to children 6 months to 4 years included in previous recommendations, all children ages 5 to 18 years of age should be vaccinated. Children aged 6 months to 8 years should receive two doses of vaccine if they have not been vaccinated previously at any time against influenza.

The current ACIP recommendations for influenza vaccination are available at:
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr57e717a1.htm

For questions about influenza surveillance in Washington, contact Erin Chester, 206-418-5500.